1. (Twice amended) A method for laser machining a depthwise self-limiting blind via in a multilayered target including at least first and second conductor layers having respective first and second conductor ablation energy thresholds and a dielectric layer having surfaces and a dielectric ablation energy threshold, the first and second conductor layers positioned above and below, respectively, the surfaces of the dielectric layer and the first and second conductor ablation energy thresholds exceeding the dielectric ablation energy threshold, comprising:

generating, from a nonexcimer laser at a first repetition rate of greater than about 200 Hz, a first laser output having a wavelength of less than 400 nm and containing at least one first laser pulse having a first energy density over a first spatial spot size, the first energy density being greater than the first conductor ablation energy threshold;

applying the first laser output to the target to remove the first conductor layer within a spot area of the target;

changing the first repetition rate of the nonexcimer laser to a second repetition rate greater than the first repetition rate to decrease the first energy density to a second energy density over a second spatial spot size, the second energy density being less than the first and second conductor ablation energy thresholds;

generating, from the nonexcimer laser at the second repetition rate, a second laser output having a wavelength of less than 400 nm and containing at least one second laser pulse having the second energy density, the second energy density being greater than the dielectric ablation energy threshold; and

applying the second laser output to the target to remove the dielectric layer within the spot area of the target and, as a consequence of the second energy density being less than the second conductor ablation energy threshold, to leave the second conductor layer substantially unvaporized and thereby form a depthwise self-limiting blind via.

2. (Amended) The method of claim 1 in which the dielectric layer comprises benzocyclobutane (BCB), bismaleimide triazine (BT), cardboard, cyanate esters, epoxies, paper, phenolics, polyimides, PTFE, or combinations thereof and at least one conductor layer comprises aluminum, copper, gold, molybdenum, nickel, palladium, platinum, silver, titanium, tungsten, or combinations thereof.

4. (Three times amended) The method of claim 1 in which the first and second laser pulses have a temporal pulse width shorter than about 100 ns, the first and second laser outputs have an average output power of greater than about 100 mW measured over their respective spatial spot sizes.

5. The method of claim 1 in which the first and second laser outputs have respective first and second output powers, and the first output power is greater than the second output power.

6. The method of claim 5 in which the first and second spatial spot sizes are the same.

7. The method of claim 1 in which the first spatial spot size is smaller than the second spatial spot size.

8. The method of claim 7 in which the first and second laser outputs have respective first and second output powers that are substantially the same.

9. (Amended) The method of claim 1 in which the first spatial spot size is less than about 100 μm across its surface diameter.

10. (Twice amended) The method of claim 1 in which the first and second laser outputs are generated by a solid-state laser comprising Nd:YAG, Nd:YLF, Nd:YAP, or Nd:YVO_4.

11. (Amended) The method of claim 1 in which the first spatial spot size defines a spot area that is smaller than and lies within a spatial region of the target, the spatial region having a periphery and a central portion, the method further comprising:

directing at least one of each of the first and second laser pulses sequentially to multiple positions associated with the spatial region to remove multiple amounts of target material corresponding to the spot areas, the multiple positions defining a contiguous set of spot areas extending outwardly from the central portion along a path to the periphery of the spatial region, to remove the target material from the spatial region and thereby produce a blind via in the target material.

12. (Amended) The method of claim 1 in which the dielectric layer includes a reinforcement material that comprises glass, aramid fibers, ceramics, or combinations thereof.

13. The method of claim 1 in which the target comprises a circuit board.

14. (Amended) The method of claim 1 wherein the first laser output is focused at a focal plane, further comprising:

positioning the target at a first distance relative to the focal plane prior to applying the first laser output; and

positioning the target at a second distance, different from the first distance, relative to the focal plane prior to applying the second laser output, thereby modifying the second spatial spot size relative to the first spatial spot size.

15. (Amended) The method of claim 1 further comprising employing variable apertures, adjustable collimators or variable lens elements to modify the second spatial spot size relative to the first spatial spot size.

16. (Amended) The method of claim 1 in which the first and second laser outputs form a first set of laser outputs, the first and second conductor layers and the dielectric layer form a first set of layers and the target comprises at least a second set of layers, including a third conductor layer and a second dielectric layer, the second set of layers positioned atop the first set of layers such that the second dielectric layer is positioned between the first and third conductor layers, the method further comprising:

prior to generating and applying the first set of laser outputs, generating and applying a second set of first and second laser outputs to form a via through the third and conductor layer and the second dielectric layer.

17. The method of claim 16 in which the via is stepped between the first and second sets of layers.

18. (Amended) The method of claim 1 in which the first and second laser outputs create a noncircular via.

20. (Amended) The method of claim 5 further comprising changing the second output power relative to the first output power by employing a Q-switch, a polarization state changer, a quarter wave plate, or a Pockel's cell.

21. The method of claim 1 in which the wavelengths of the first and second pulses comprise 355 nm or 266 nm.

22. (Amended) The method of claim 1 in which the second conductor layer absorbs at the wavelength of the second laser output and the second energy density remains below the ablation energy threshold of the second conductor layer.

24. (Amended) The method of claim 1 in which the first and second laser outputs are generated by a solid-state, Q-switched laser.

26. The method of claim 1 in which the first and second laser outputs comprise the same wavelength.

29. (Amended) The method of claim 21 in which the second spatial spot size is greater than the first spatial spot size.

31. (Amended) A method for laser machining a blind via in a multilayered target including at least first and second conductor layers having respective first and second conductor ablation energy thresholds and a dielectric layer having surfaces and a dielectric ablation energy threshold, the first and second conductor layers positioned above and below, respectively, the surfaces of the dielectric layer, comprising:

generating, from a nonexcimer laser at a repetition rate of greater than about 200 Hz, a first laser output having a wavelength of less than 400 nm and containing at least one first laser pulse having a first energy density over a first spatial spot size and a temporal pulse width shorter than about 100 ns, the first energy density including an average output power of greater than about 100 mW measured over the first spatial spot size and being greater than the first conductor ablation energy threshold;

applying the first laser output to the target to remove the first conductor layer within a spot area of the target;

generating from a nonexcimer laser at a repetition rate greater than about 200 Hz, a second laser output having a wavelength of less than 400 nm and containing at least one second laser pulse having a second energy density over a second spatial spot size and a temporal pulse width shorter than about 100 ns, the second energy density including an average output power of greater than 100 mW, being greater than the dielectric ablation energy threshold, and being different from the first energy density; and

applying the second laser output to the target to remove the dielectric layer within the spot area of the target to form a blind via.

32. The method of claim 31 for laser machining a depthwise self-limiting blind via in which the first and second conductor ablation energy thresholds exceed the dielectric ablation energy threshold, further comprising:

after removing the first conductor layer within the spot area, increasing the first repetition rate of the nonexcimer laser to the second repetition rate to decrease the first energy density to the second energy density, the second energy density being less than the first and second conductor ablation energy thresholds;

generating the second laser output at the second repetition rate; and

applying the second laser output to the target to remove the dielectric layer within the spot area of the target and, as a consequence of the second energy density being less than the second conductor ablation energy threshold, to leave the second conductor layer substantially unvaporized and thereby form a depthwise self-limiting blind via.

35. The method of claim 2 in which the first and second laser outputs comprise the same wavelength.

36. The method of claim 14 in which the first and second laser outputs comprise the same wavelength.